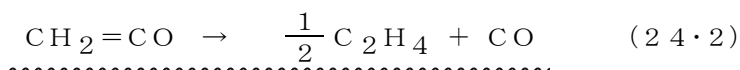
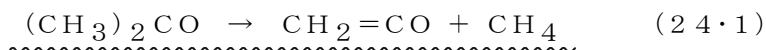
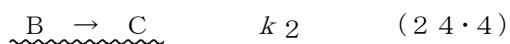
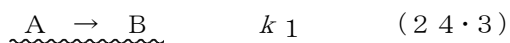


XXIV 種々の反応

【逐次反応 consecutive reaction】



[反応速度式]



$$\frac{d[\text{A}]}{dt} = -k_1[\text{A}] \quad (24\cdot5)$$

$$\frac{d[\text{B}]}{dt} = k_1[\text{A}] - k_2[\text{B}] \quad (24\cdot6)$$

$$\frac{d[\text{C}]}{dt} = k_2[\text{B}] \quad (24\cdot7)$$

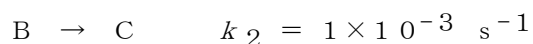
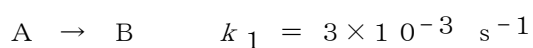
[濃度変化]

$$[\text{A}] = [\text{A}]_0 \exp(-k_1 t) \quad (24\cdot8)$$

$$[\text{B}] = \frac{k_1}{k_2 - k_1} [\text{A}]_0 \{\exp(-k_1 t) - \exp(-k_2 t)\} \quad (24\cdot9)$$

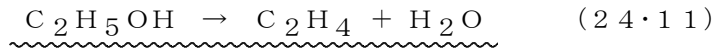
$$[\text{C}] = [\text{A}]_0 \left\{ 1 - \frac{k_1}{k_2 - k_1} (k_2 \exp(-k_1 t) - k_1 \exp(-k_2 t)) \right\} \quad (24\cdot10)$$

[問24・1] 逐次反応

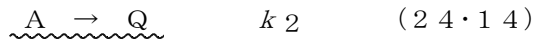
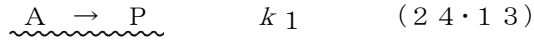


において、 $[\text{A}]_0 = 1 \text{ mol dm}^{-3}$ であるとき、A、B、C のそれぞれの濃度の時間変化を描け。

【平行反応 parallel reaction】



[反応速度式]



$$\frac{d[\text{A}]}{dt} = -k_1[\text{A}] - k_2[\text{A}] \quad (24 \cdot 15)$$

$$\frac{d[\text{P}]}{dt} = k_1[\text{A}] \quad (24 \cdot 16)$$

$$\frac{d[\text{Q}]}{dt} = k_2[\text{A}] \quad (24 \cdot 17)$$

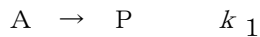
[濃度変化]

$$[\text{A}] = [\text{A}]_0 \exp\{-(k_1 + k_2)t\} \quad (24 \cdot 18)$$

$$[\text{P}] = \frac{k_1}{k_1 + k_2} [\text{A}]_0 \{1 - \exp(-(k_1 + k_2)t)\} \quad (24 \cdot 19)$$

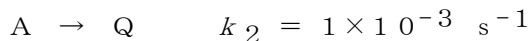
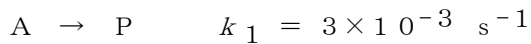
$$[\text{Q}] = \frac{k_2}{k_1 + k_2} [\text{A}]_0 \{1 - \exp(-(k_1 + k_2)t)\} \quad (24 \cdot 20)$$

[問 24・2] 2つの平行反応



の反応速度定数の比 k_1/k_2 が 3 であるとき、2つの生成物の濃度の比はどうか

[問 24・3] 平行反応



において、 $[\text{A}]_0 = 1 \times 10^{-2} \text{ mol dm}^{-3}$ であるとき、A, P, Q のそれぞれの濃度の時間変化を描け。